Gateway

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The ARRL Packet-Radio Newsletter

FCC GRANTS ARRL HF-PACKET STA REQUEST

As reported in Gateway, [Volume 3, Number 19, "ARRL FILES HF AUTOMATIC CONTROL STA REQUEST"] ARRL filed a request for special temporary authority (STA) on behalf of a number of HF packet BBS stations for the purpose of operating under automatic control. On July 7, ARRL received the FCC reply indicating approval of the STA request. In replying, the FCC noted that:

"On October 6, 1986, the FCC adopted a Memorandum Opinion and Order in PR Docket No. 85-105 which deferred consideration of the matter of automatic control of amateur stations transmitting digital communications on amateur service frequencies below VHF. The FCC did not authorize such action because of the greater possibility of congestion than on VHF and above. The [ARRL] stated in that proceeding that such an authorization would be premature while operating standards are still evolving. ARRL said that it planned to coordinate a small group of packet radio enthusiasts, not limited to ARRL members, to request special temporary authorization to determine the feasibility of such operation. The FCC stated that organized feasibility projects conducted by a manageable group of amateur stations such as that planned by ARRL will be helpful in determining any rules necessary to prevent interference to and from other amateur operations.

[ARRL's] request is consistent with the FCC's decision. Accordingly, an STA is granted for a period of 180 days commencing with the date of this authorization... During this time, Section 97.69(d) is waived to the extent that [the authorized stations] may be under automatic control when transmitting digital communications below 29.7 MHz, and Section 97.80(b) is waived to the extent that these stations may be operated under automatic control while retransmitting third-party traffic under the same conditions as permitted stations retransmitting digital packet communications on frequencies above 50 MHz."

PACKET HAPPENINGS AT ARRL BOARD MEETING

At the meet 1987 second meeting of the ARRL Board of Directors, held in Atlanta July 9 and 10, the Board voted the following:

"The Packet Radio frequency recommendations of the Ad Hoc Committee on Amateur Digital Communications below 225 MHz are adopted as interim guidance, and, in recognition of regional differences and the rapid expansion of this mode, the Ad Hoc Committee is requested to continue development of Packet Radio frequencies for consideration by the Board through the Membership Services Committee."

In a later action, the Board also voted that this Interim Band Plan, as well as the Ad Hoc Committee's recommendations for frequencies in the 70-cm band and above, be referred to the VHF Repeater Advisory Committee and VHF-UHF Advisory Committee for their study and recommendations.

The Interim Band Plan adopted is as follows:

80 through 20 meters

Note that the objective is to minimize impact on existing (nonpacket) operations, recognizing that the spectrum in these HF bands is a limited resource. 1200-baud operation should be possible using the spectrally-efficient emission mode of minimum-shift keying (MSK). With a view toward eventual adoption of such systems, a 2-kHz channel spacing is assumed.

Use of the RTTY subbands for packet operations is encouraged. The following frequencies are exceptions to this rule to provide usable automatic-message-forwarding channels: (Frequencies specified are center-channel.)

Intercontinental message forwarding:
3594.3, 7038.3, 10145.2 and 14102.3 kHz
North American message forwarding:
3607.3, 7091.3 and 10147.3 kHz
Intracontinental message forwarding:
14108.3 kHz

20-meter frequencies should be considered experimental in nature.

30-meter frequency use is subject to noninterference to fixed stations outside the US.

160 and 17 through 10 meters

The frequencies listed below conform to the RTTY subbands and are suggested for automatic message forwarding, subject to favorable propagation:

1802.3, 18106.3, 18108.3, 21096.3, 21098.3, 24926.3, 24928.3, 28102.3 and 28104.3 kHz.

The 28-MHz frequencies are chosen as potential network entry points for Novices and Technicians.

6 Meters

National simplex packet frequency:
51.70

Duplex pairs (locally coordinated)
50.62 - 51.62
50.64 - 51.64
50.66 - 51.66
50.68 - 51.68
50.72 - 51.72
50.74 - 51.74
50.76 - 51.76
50.78 - 51.78

Note: High-in, low-out duplex operation is recommended to protect cosited voice repeaters.

2 Meters

Automatic/unattended operations on:
145.01 (inter-LAN use), 145.03, 145.05, 145.07 and 145.09 MHz.

1.25 Meters

100-kHz-bandwidth channels:
220.55, 220.65, 220.75, 220.85 and 220.95 MHz.

20-kHz-bandwidth channels:
221.01, 221.03, 221.05, 221.07 and 221.09 MHz.

223.40 National packet simplex calling

Other Novice-band candidate packet simplex channels shared with FM voice operations and coordinated with local frequency coordinators:
223.42, 223.44, 223.46 and 223.48 MHz

Specific use of frequencies in the 6, 2 and 1.25 meter bands should be determined by local user groups. Additional frequencies (including any duplex operation) should be coordinated with local frequency coordinators.

UK RESEARCHERS TEST ADAPTIVE HF MODEM

Jeff Ward, GØ/K8KA, relays the following summary of a paper from the University of Manchester Institute of Science and Technology. The paper is by G. F. Gott and E. P. Darbyshire and it describes an experimental HF chirp modem that is able to reject interference from other HF users by adaptive filtering at the receiver. A "chirp" modem operates by sweeping across a defined band of frequencies as it transmits. The purpose of such a system is to minimize interference from other signals. The modem described in the paper sweeps across a 2.7-kHz bandwidth and transmits a differential phase-shift-keyed signal at 75 bit/s.

The detector includes an interference assessor which measures interference levels across the chirp signal bandwidth. Those parts of the spectrum containing severe interference are then rejected by adaptive filtering, before the data decisions are made, suppressing the interference and the corresponding parts of the chirp signal spectrum. This enhances the signal-to-interference ratio and improves the error rate. The system has been tested over a 170-km point-to-point HF link.

Does a system of this type have potential for amateur packet radio? Is anyone in the amateur packet community working on like systems? We'd like to hear about it!

COSI UPDATE

Development of the X.25 level-3 based COSI-Switch is still progressing. Several problems related to code space have been encountered and resolved. We have worked to provide a networking box based on easy-to-obtain and inexpensive hardware. The target processor is a TNC 2 or a DR-200. These Z80 based machines are equipped with 32 kbytes of ROM and 32 kbytes of RAM and either two or four ports.

The COSI-Switch is designed to support normal level-2 and enhanced level-3 user connections. Some changes to the switch user interface description have been made in order to improve compatibility with existing systems and to recover code space. The basic switch functions originally described will be supported, but with the syntax and procedures simplified. We are making our best effort to produce these changes, subject to the time available to pursue our hobby!

RATS will produce a fully functional level-3 X.25 switch. We have an extensive network to demonstrate its capabilities to the amateur community. We have received a large number of requests from the Amateur community worldwide. It is with this encouragement we are able to proceed with enthusiasm toward our goal.

COSI-Switch is part of a family of systems designed to enhance communications for the radio amateur. COSI-PAD is an EPROM-based program for the TNC 2 which will allow normal level-2 or enhanced level-3 connections. The basic interface to the TNC will remain the same, but two new parameters are added: MYSWITCH and NETWORK. MYSWITCH is a parameter which tells the TNC which switch is managing the LAN, and therefore which switch will handle level-3 calls made by the TNC. In level-3 mode the basic "C SPACE" command of the TNC is preserved. The NETWORK command is a simple ON/OFF for Level 3 mode. Inbound connections are automatically detected as level 2 or 3 through the use of the protocol ID byte.

COSI-Pac is another part of the integrated family of systems. It is a communication package which will allow an IBM PC and "normal" TNC to have level-3 networking capabilities along with upper-level (Transport, Session, Presentation and Application) protocol support for simultaneous terminal-to-terminal and file-transfer sessions. This software will support binary or ASCII data, and interrupted and resumed transfers. This will eliminate the need to "start over" when connections are lost. A later release of this software will be incorporated into the PRMBS (Packet Radio Mail Box System) written by KA2BQE. We expect to start distribution of some of these packages around the time of ARRL Computer Networking Conference in late August.

RATS wishes to emphasize the need for protocol implementations which serve the needs of the average user, the network "hot dog," the network trustees and the service regulators on a worldwide basis. We have adopted a design methodology which is ambitious and definitely long-term in scope.

Public-domain software implementations of internationally recognized CCITT/ISO standards are few and far between. We will be placing our source code into the public domain for non-commercial use. It is this approach which will help bring advanced communications tools to the average radio amateur or computer hobbyist.

From Gordon Beattie, N2DSY, via CompuServe

MORE ABOUT TEXNET

[We've been reporting the progress of the Texas Packet Radio Society (TPRS) in designing and implementing the TEXNET networking system. Here's the latest...]

The Node Control Processor PC board artwork for version 2.1 is now at the PC manufacturer. Our initial order is for 5 boards. Tom McDermott will build one and test it. After we've tested the first one and its pronounced OK, we'll take orders for the first regular production run of PC boards. We'll have the other 4 boards to sell immediately, one each to the San Antonio, Austin, Houston and Rockport groups.

One of the design specifications of the ideal TexNet node includes a UPS, an uninterruptible power supply and battery charger. Tom McDermott, N5EG, has completed a second version of the design and has built and tested a prototype. This supply powers a 25-watt 440-MHz rig, a 10-watt 2-meter rig, the two modems (9600- and 1200-baud), and the NCP with a reserve. In addition, it maintains a charge on a gelled-electrolyte battery that is automatically switched into service without interrupting the node's operations when the ac power fails.

On-the-air operations of the four high-speed nodes in the Dallas area have indicated that the radio equipment is the most fragile portion of the network system. NCP software has not suffered a single failure in operation since October! The one NCP hardware failure was a shorted diode. Every other failure has been in the radio transceivers, either the user port 2-meter radios or the 440-MHz radios.

Software testing is ongoing but has tapered off significantly. Tests have demonstrated how sturdy the code is, allowing a network to be built using combinations of different radio links, modem data rates, and alternate paths. PMS (Packet Message Server) use has picked up and a large number of users are seen as regulars on the system. One final compatibility issue with the WØRLI code has been resolved. Users on TexNet can now check into the WA5MWD mailbox (or any other mailbox running WØRLI version 3.2) and be recognized automatically by their own call sign and not as a TexNet node! Forwarding between WA5MWD and PMS has been running automatically for some time.

Louis Guido, N5JKH and his son, Paul, N5IUT, took on the task of building a splitter for 445.1 MHz. Specifications from Tom, N5EG were sent to the Guidos. A frequency- and impedance-response sweep of the splitter they built, shows good SWR and impedance matches to both output ports. Parts are standard tubing sizes and inexpensive. More information later on the splitters.

Tom McDermott, N5EG, has written a preliminary specification of the TexNet layer-3 protocol. It will be delivered by Tom Aschenbrenner, WB5PUC, as a paper at the 1987 ARRL Computer Networking Conference in August and will be available in the Proceedings of the conference. There is high interest and speculation throughout the country as to what TexNet will turn out to be. Those of you who subscribe to CompuServe, have seen hints of the interest.

56-KBIT/S MODEMS DEMONSTRATED AT ARRL NATIONAL

The 56-kbit/s modem designed by Dale Heatherington, WA4DSY, was demonstrated at the 1987 ARRL National Convention in Atlanta July 11 and 12. The folks from the Georgia Radio Amateur Packet Enthusiast Society (GRAPES) provided the setting for an impressive demonstration of the modem's capabilities at their packet booth, with Doug Drye, KD4NC, acting as "point man" for the demonstrations.

The practical use of the modems was demonstrated by connecting each modem to a modified KISS TNC and IBM PC computer running KA9Q's NET.EXE program, which uses the ARPA protocol suite. [See Gateway Volume 3, Numbers 12 and 17.] Most impressive were the demonstrations of file transfers between similarly equipped systems, with transfer of a 1.2-Mbyte file being accomplished in less than 10 minutes! The realization that the KISS TNC and the computer serial port limit the speed at which data can be transferred from the computer to the modem comes as something of a shock to those of us used to having the TNC's modem being the limiting factor! Now the roadblock to making full use of the speed of the modem is in producing a higher-speed digital device, be it a TNC or a plug-in board for a computer.

A number of beta-test sites for the modem have received PC boards and are in the process of constructing them preparatory to testing. There may be a few more beta-test board sets available as you read this. Beta testers are selected on the basis of their ability to return useful feedback to GRAPES. Minimum requirements for beta testers are: 1) availability of some test equipment, such as a 50-MHz dual-trace oscilloscope and a 29-MHz RF signal generator, 2) the ability to place the modem into use at a high-traffic site, and 3) a commitment to provide timely reporting of test results to GRAPES. Contact KD4NC for further information. General availability of the modems depends almost entirely on the rapidity with which beta-test feedback is received.

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